Frequently Asked Questions - Medical Professionals

The amount of radiation that people are receiving from medical sources is increasing, and this includes children. It is difficult to show directly that radiation doses from CT lead to cancer. However, good data from other sources of exposure show that there are increased cancers in people who have been exposed to radiation at levels that can be encountered by patients undergoing CT scans. This is particularly important in children, whose tissues are more radiosensitive, who receive a larger effective dose for a given level of radiation, and who have a longer time to develop cancers resulting from radiation exposure. For any one person, the lifetime risk of death from cancer is about 1 in 5. While estimates vary, for a child undergoing a single CT of the abdomen and pelvis increases that risk by 1 in 1,000. The risk is cumulative, however, and each subsequent CT scan will increase the risk accordingly. While for any one individual the increased risk is very small, given the large number of CT scans performed the risk to the population as a whole is much larger.

Do children really undergo many CT scans?
The population of the United States is second only to Japan in per capita CT exams performed. There are approximately 7 million CT studies performed in children every year in the United States, and the number is increasing approximately 10% per year. CT is widely used among all ages of children, with 33% performed in children under 10 years of age. CT is the largest contributor to medical radiation dose in the United States.

Can the risk from CT be lessened while still obtaining diagnostic quality studies?
Absolutely. There are many techniques that can be used to dramatically lessen the amount of radiation children are exposed to during CT, while still enabling diagnostic quality images (see also What Can I Do? Section). These include:
- Scan only the area required. Scanning beyond the body regions where there is clinical concern results in needless exposure.
- Reduce tube output (kVp and mAS). Exposure parameters should be reduced for the smaller patient size. A number of suggested protocols are available (click here)
- Perform single phase studies. Most pediatric conditions are readily diagnosable with single phase CT; more phases unnecessarily increases radiation dose without adding to diagnoses.
- Use breast shields for girls undergoing chest CT studies.
- Should I not order CT scans for my pediatric patients?
CT is an extremely useful imaging modality that can provide valuable and even life-saving medical information, and thus can provide more benefit than harm. Like any test, there should be clear reasons to order a CT scan. For many indications, a test like ultrasound or magnetic resonance imaging may provide the same information without exposing a child to radiation. The American College of Radiology (ACR) has imaging appropriateness criteria for a number of pediatric conditions and discusses the utility of various imaging strategies. Discussing the clinical situation and the medical information desired with the pediatric radiologists providing your imaging services can help determine if an alternative test might be better. If a CT scan is needed, make sure that your imaging facility uses appropriate radiation reduction protocols and techniques, and that those interpreting these pediatric studies are qualified.

How can I determine if my imaging providers are using appropriate CT techniques?
Without asking, you won’t know. Some facilities may not alter dose technique for studies on children. This website has published a straightforward method that can be implemented at your site with the help of a medical physicist. It is unique in that it does not depend on the manufacturer, model or age of the scanner. While there may be variability depending upon CT scanner manufacturer and institution, there are also a number of published suggested techniques that facilities can use that provide substantial dose savings. Similarly, most adult protocols call for scanning the same area several times (multiple phases); this is rarely required for pediatric conditions and results in needless additional radiation exposure.

Ask:
- if your imaging facility is accredited by the American College of Radiology (ACR)
- if the CT technologists are credentialed
- if a board certified radiologist or pediatric radiologist will be interpreting the study
- Should I talk to parents about the risks involved in getting a CT?

The long-term risks of exposure to medical radiation are small but real. However, the diagnostic value that a CT can provide in the short-term usually far outweighs the long-term risks. Most patients are not informed of any potential risks from radiation prior to the exam (Lee CI, et al. *Diagnostic CT scans: assessment of patient, physician and radiologist awareness of radiation dose and possible risk*. Radiology 2004;231:393-398), although some institutions are requiring patient informed consent prior to undergoing CT. While it seems like this would deter patients from getting potentially important exams performed, a recent research study found that parents who were told about the risks and benefits of CT still agreed to go ahead and have the study performed (Larson DB, et al. *Informing parents about CT radiation exposure in children: it’s OK to tell them*. AJR 2007;189:271-275). In short, you should not hesitate to discuss the potential risks of CT radiation with patients and families.

Where can I find guidelines/protocols for pediatric CT?
Return to the “What can I Do?” section of this website for specific suggestions and guidelines for every member of the Imaging team including protocol recommendations.